FIG.1

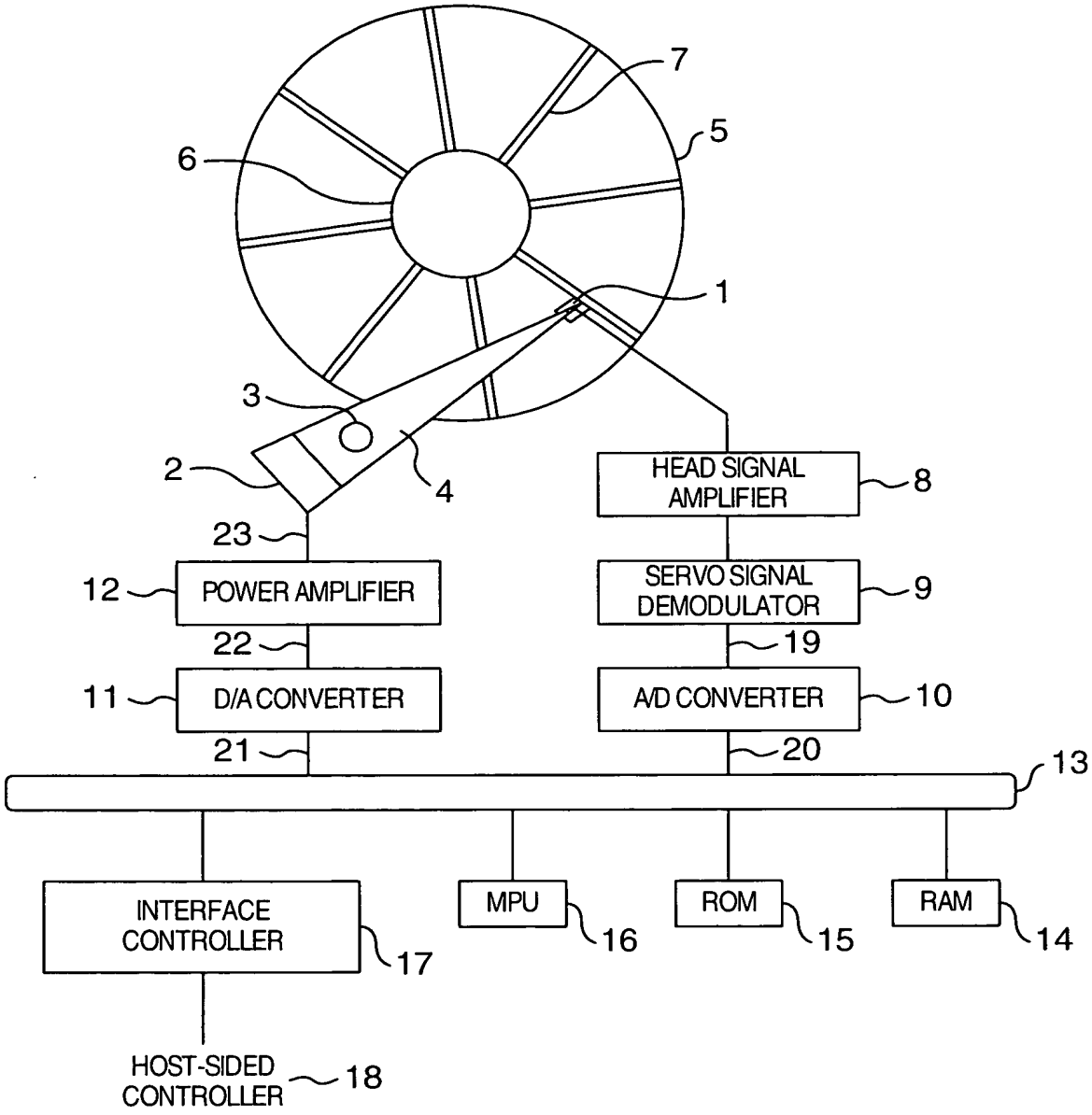

7
5
6
1
3
2
4
HEAD SIGNAL AMPLIFIER
8
23
12
POWER AMPLIFIER
SERVO SIGNAL DEMODULATOR
9
22
19
11
D/A CONVERTER
A/D CONVERTER
10
21
20
13
INTERFACE CONTROLLER
17
MPU
16
ROM
15
RAM
14
HOST-SIDED CONTROLLER
18

FIG.2

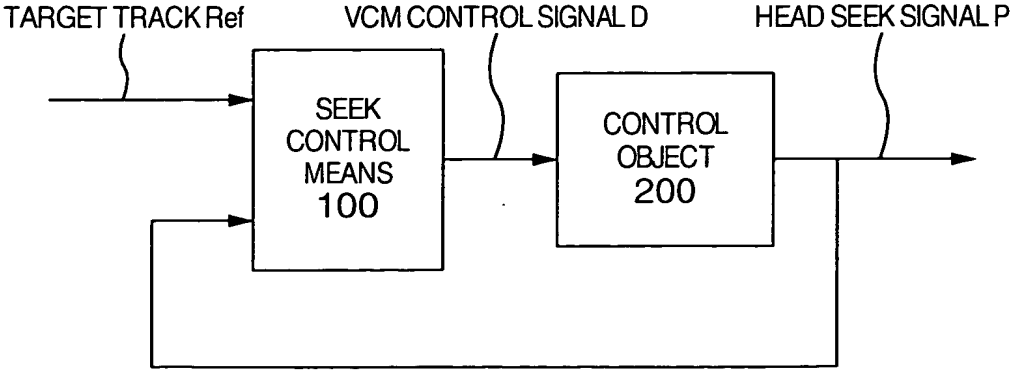

TARGET TRACK Ref
VCM CONTROL SIGNAL D
HEAD SEEK SIGNAL P
SEEK CONTROL MEANS 100
CONTROL OBJECT 200

FIG.3

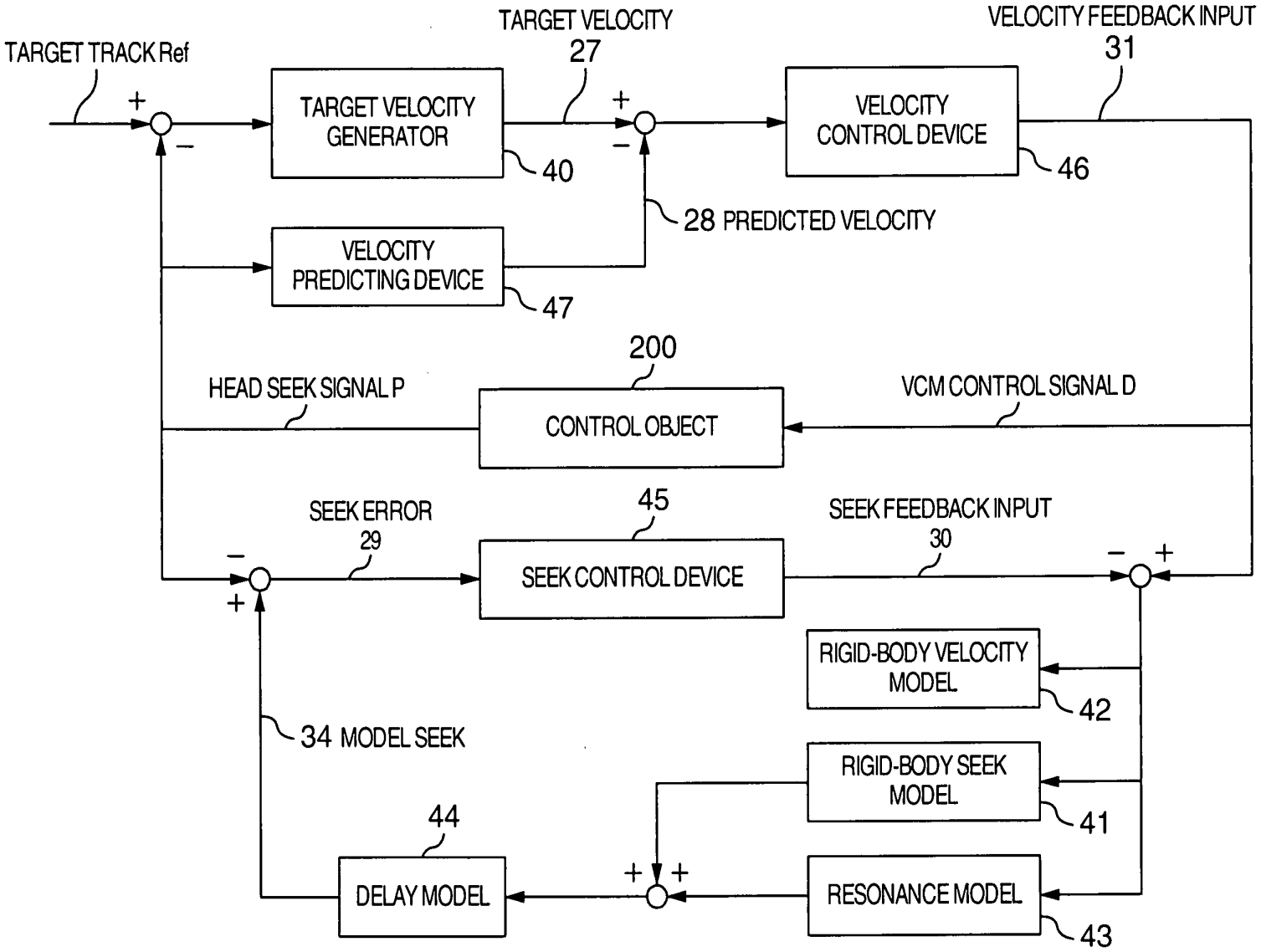

TARGET TRACK Ref
TARGET VELOCITY
27
VELOCITY FEEDBACK INPUT
31
TARGET VELOCITY GENERATOR
40
VELOCITY CONTROL DEVICE
46
28 PREDICTED VELOCITY
VELOCITY PREDICTING DEVICE
47
200
HEAD SEEK SIGNAL P
CONTROL OBJECT
VCM CONTROL SIGNAL D
SEEK ERROR
29
45
SEEK FEEDBACK INPUT
30
SEEK CONTROL DEVICE
RIGID-BODY VELOCITY MODEL
42
34 MODEL SEEK
RIGID-BODY SEEK MODEL
41
44
DELAY MODEL
RESONANCE MODEL
43

FIG.4

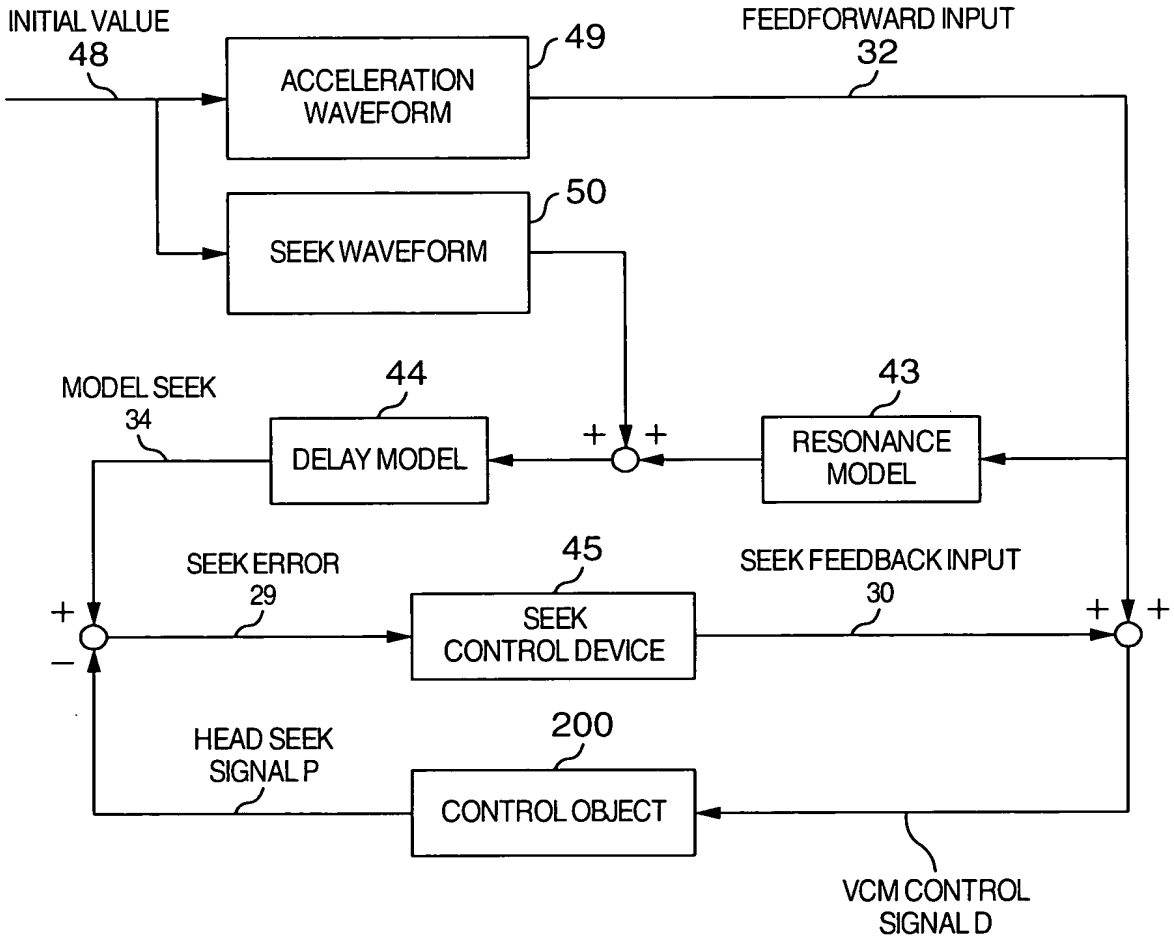

INITIAL VALUE
48
ACCELERATION WAVEFORM
49
FEEDFORWARD INPUT
32
SEEK WAVEFORM
50
MODEL SEEK
34
44
DELAY MODEL
+
+
43
RESONANCE MODEL
SEEK ERROR
29
45
SEEK CONTROL DEVICE
SEEK FEEDBACK INPUT
30
+
−
+
+
HEAD SEEK SIGNAL P
200
CONTROL OBJECT
VCM CONTROL SIGNAL D

FIG.5A

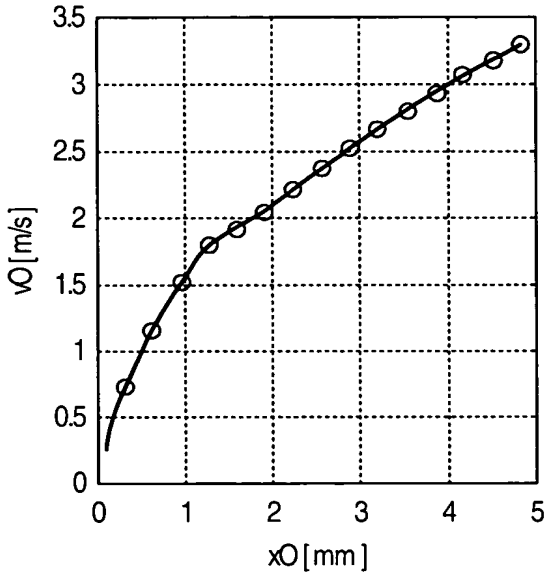


FIG.5B

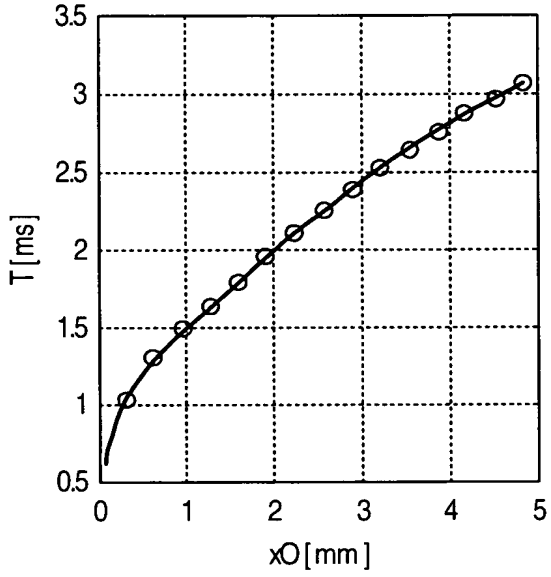


FIG.6

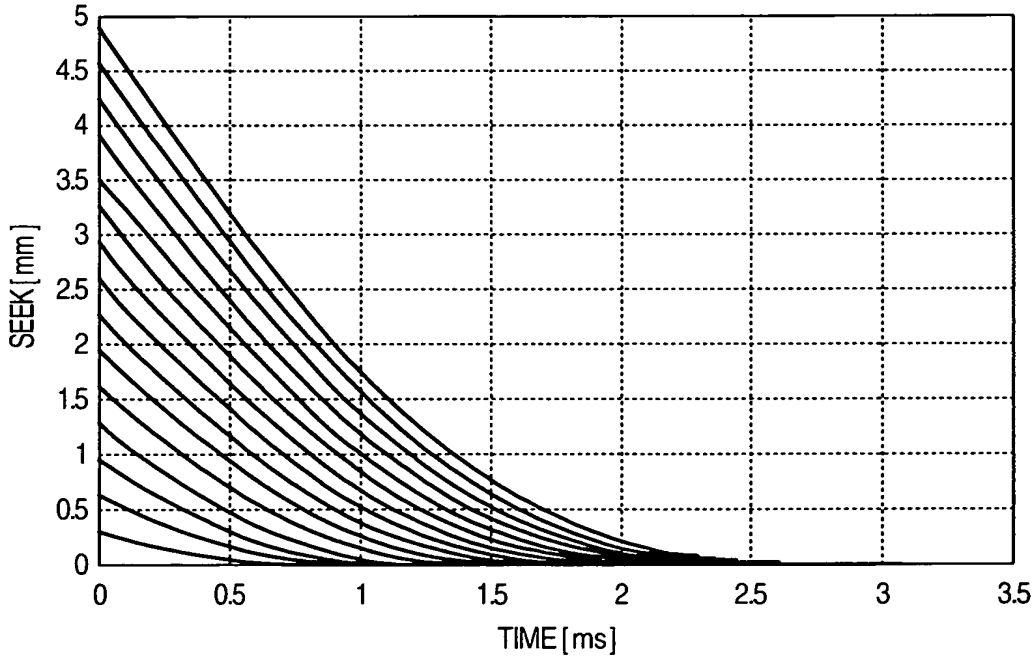


FIG.7

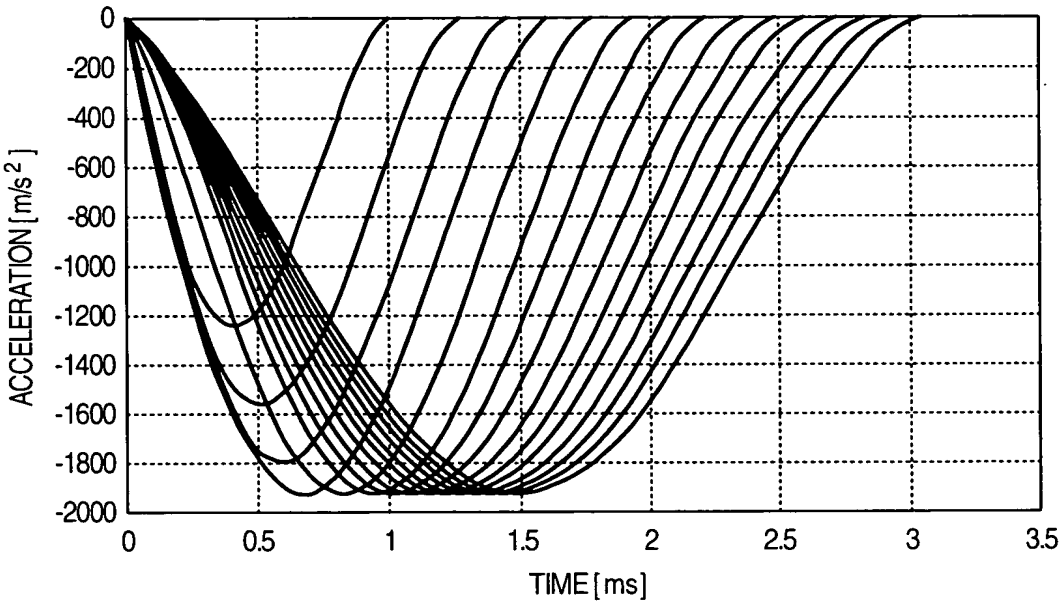

0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
-2000
ACCELERATION [m/s^2]
0
0.5
1
1.5
2
2.5
3
3.5
TIME [ms]

FIG.8

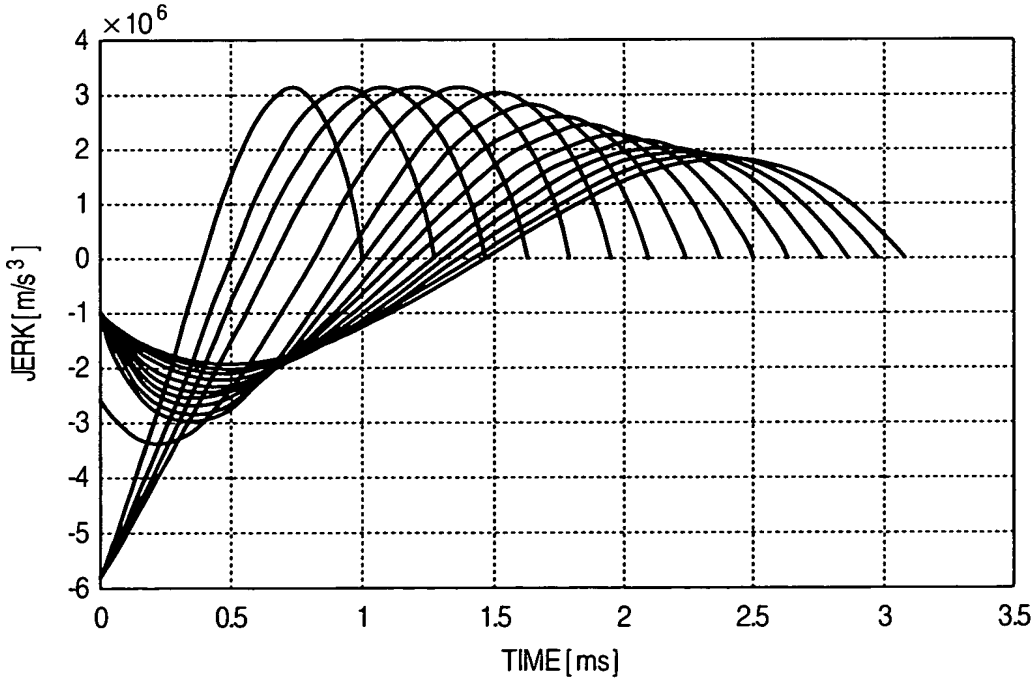

×10^6
4
3
2
1
0
-1
-2
-3
-4
-5
-6
JERK [m/s^3]
0
0.5
1
1.5
2
2.5
3
3.5
TIME [ms]

FIG.9

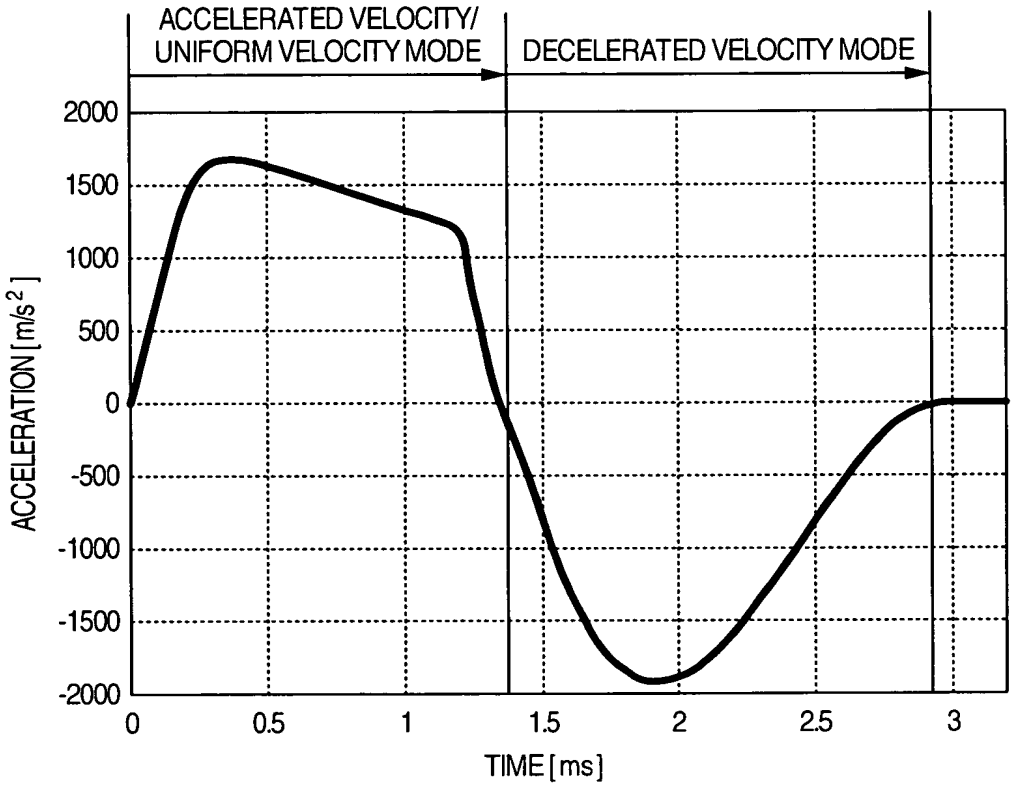

ACCELERATED VELOCITY/
UNIFORM VELOCITY MODE
DECELERATED VELOCITY MODE
2000
1500
1000
500
0
-500
-1000
-1500
-2000
ACCELERATION [m/s2]
0
0.5
1
1.5
2
2.5
3
TIME [ms]

FIG.10

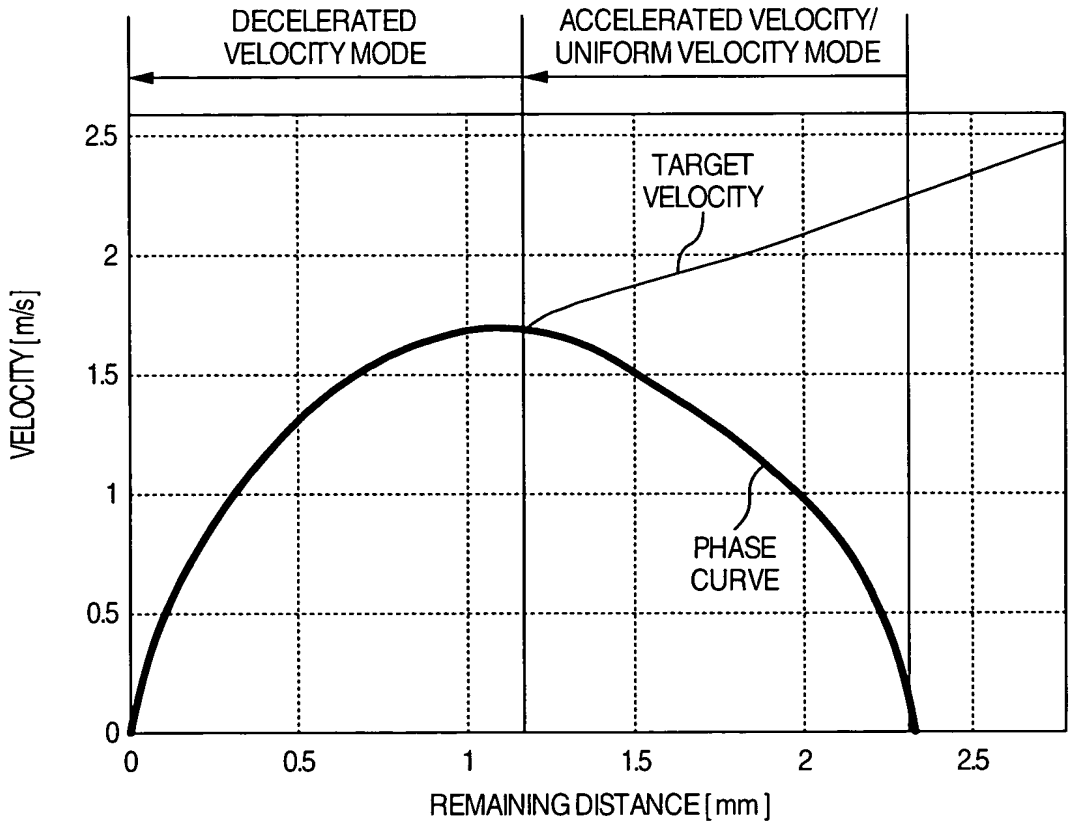

DECELERATED VELOCITY MODE
ACCELERATED VELOCITY/ UNIFORM VELOCITY MODE
TARGET VELOCITY
PHASE CURVE
VELOCITY [m/s]
REMAINING DISTANCE [mm]
0
0.5
1
1.5
2
2.5

FIG.11

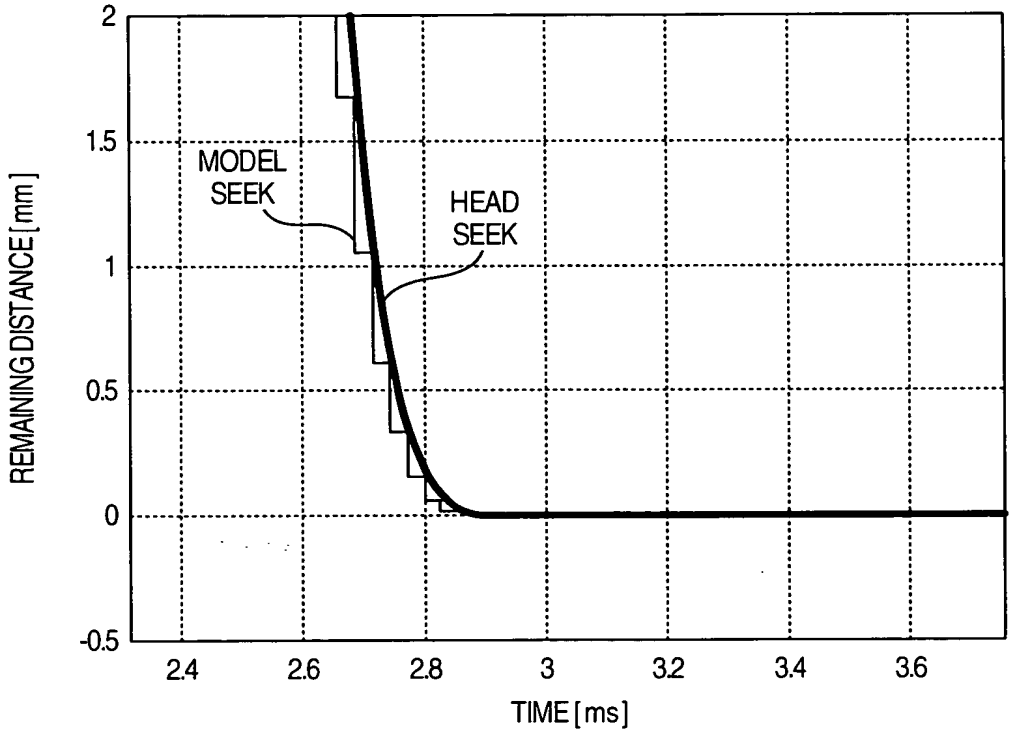

2
1.5
1
0.5
0
-0.5
REMAINING DISTANCE [mm]
MODEL SEEK
HEAD SEEK
2.4
2.6
2.8
3
3.2
3.4
3.6
TIME [ms]

FIG.12

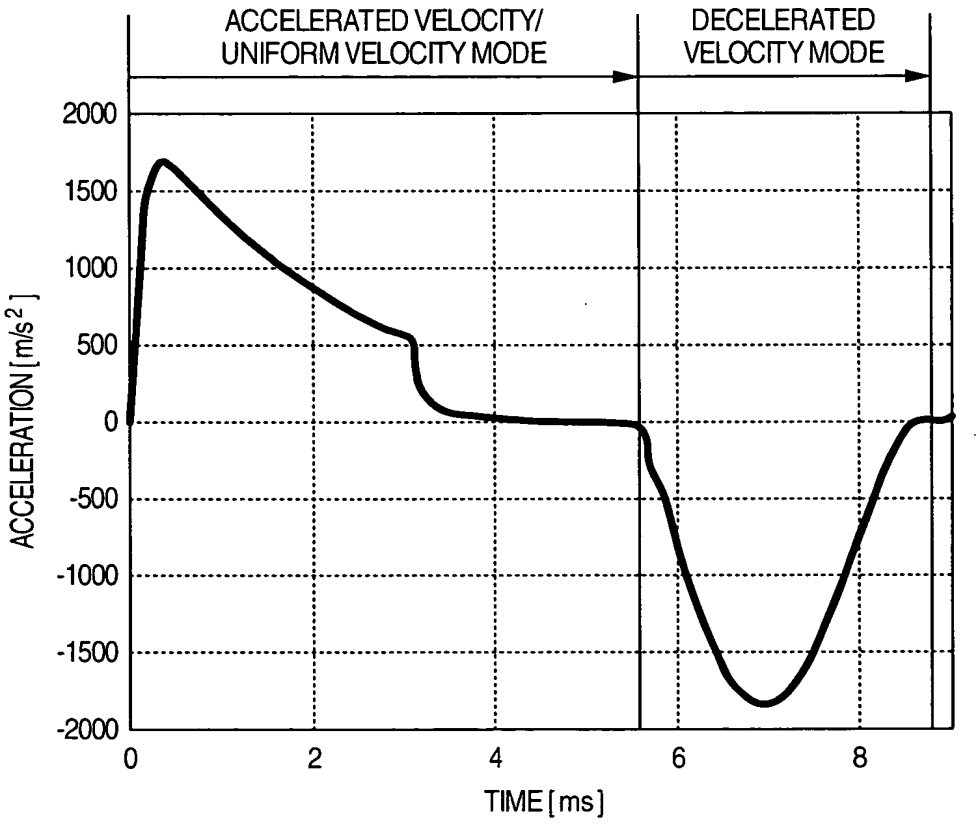

ACCELERATED VELOCITY/
UNIFORM VELOCITY MODE
DECELERATED
VELOCITY MODE
2000
1500
1000
500
0
-500
-1000
-1500
-2000
ACCELERATION [m/s2]
0
2
4
6
8
TIME [ms]

FIG.13

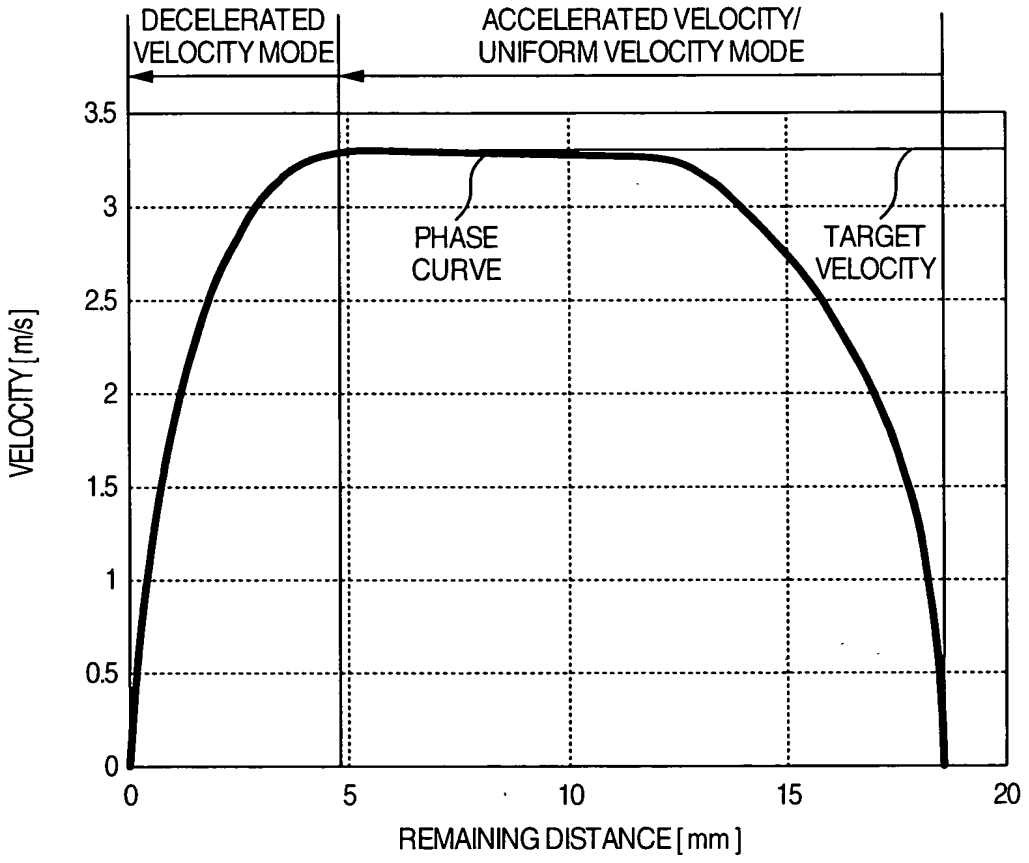

DECELERATED VELOCITY MODE
ACCELERATED VELOCITY/ UNIFORM VELOCITY MODE
PHASE CURVE
TARGET VELOCITY
VELOCITY [m/s]
3.5
3
2.5
2
1.5
1
0.5
0
0
5
10
15
20
REMAINING DISTANCE [mm]

FIG.14

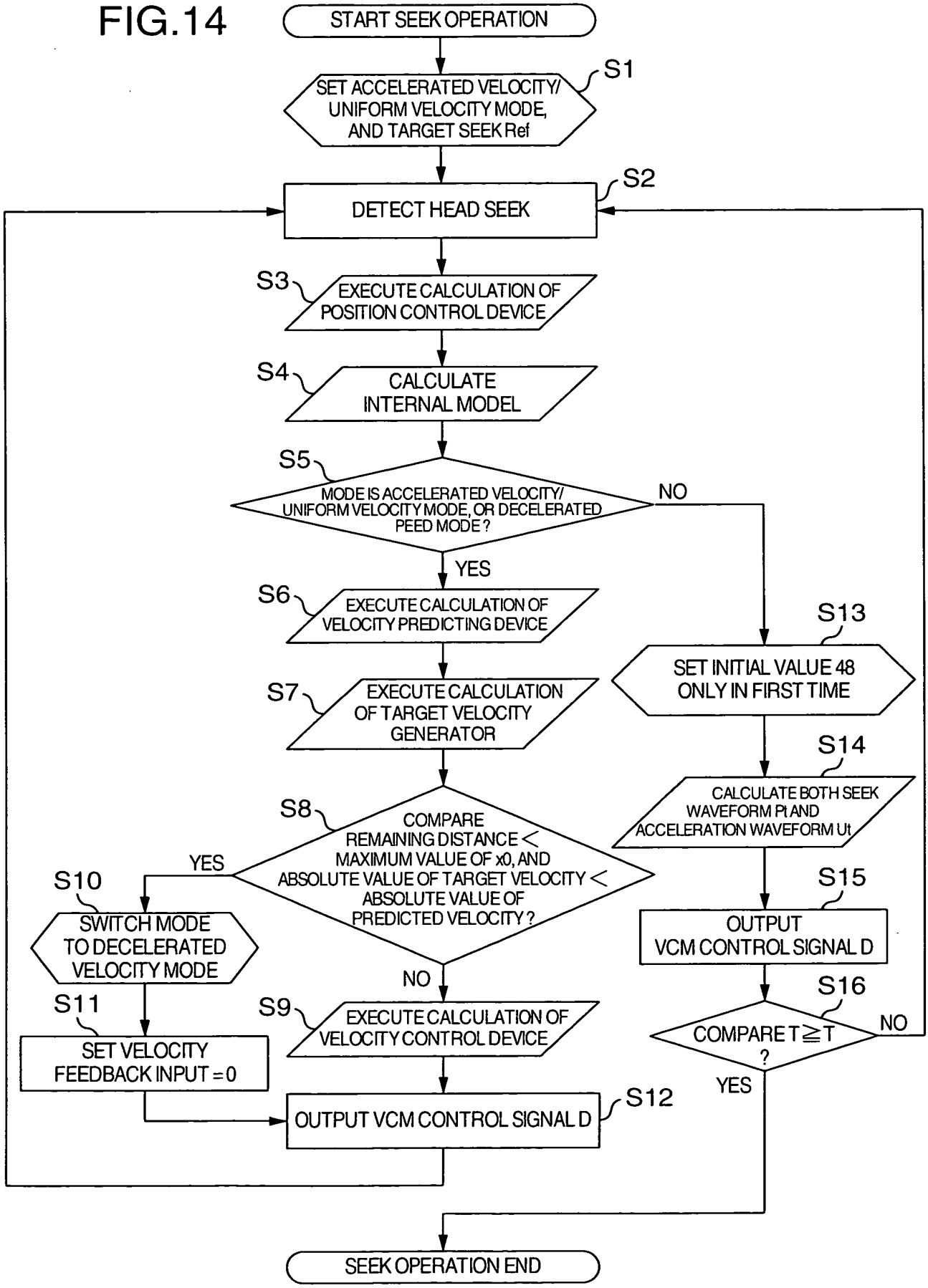
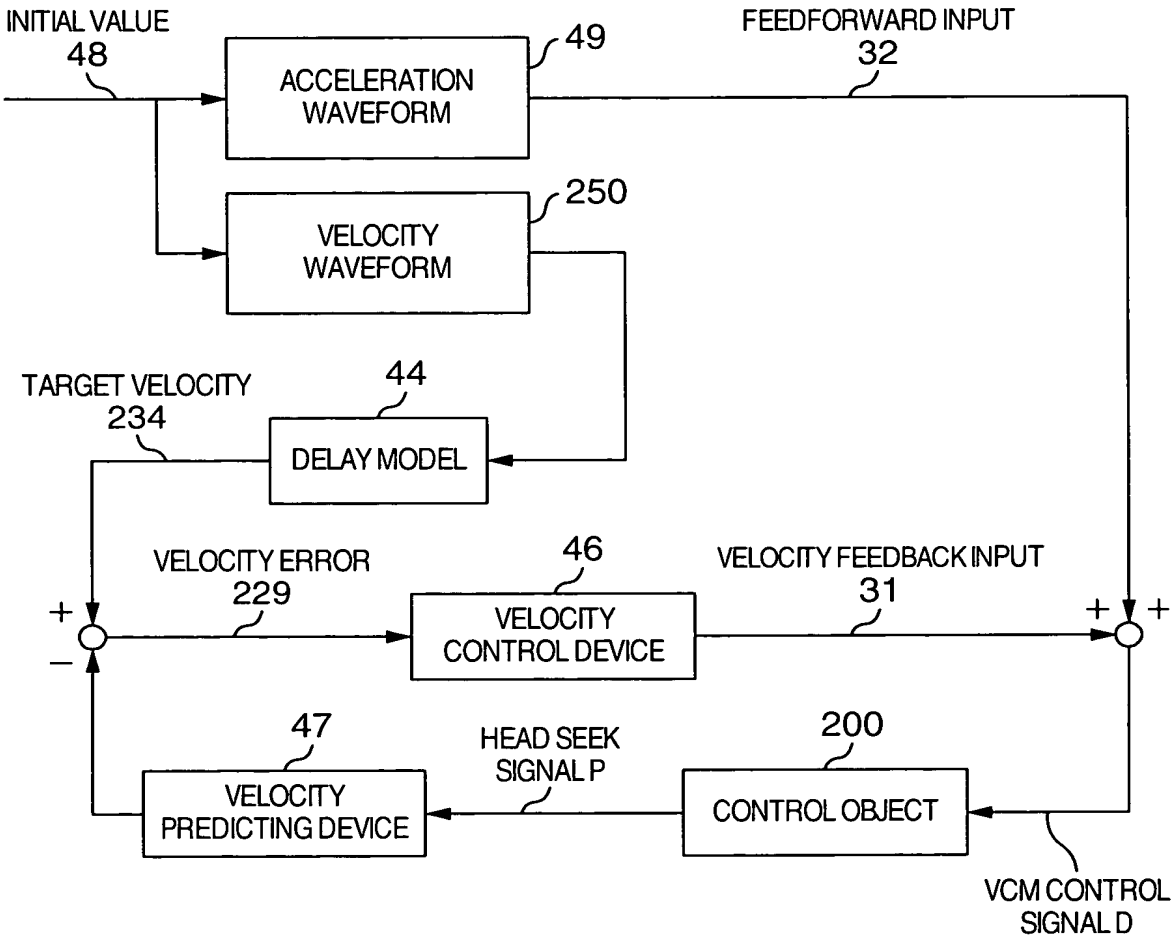

START SEEK OPERATION
S1
SET ACCELERATED VELOCITY/ UNIFORM VELOCITY MODE, AND TARGET SEEK Ref
S2
DETECT HEAD SEEK
S3
EXECUTE CALCULATION OF POSITION CONTROL DEVICE
S4
CALCULATE INTERNAL MODEL
S5
MODE IS ACCELERATED VELOCITY/ UNIFORM VELOCITY MODE, OR DECELERATED PEED MODE ?
NO
YES
S6
EXECUTE CALCULATION OF VELOCITY PREDICTING DEVICE
S7
EXECUTE CALCULATION OF TARGET VELOCITY GENERATOR
S8
COMPARE REMAINING DISTANCE < MAXIMUM VALUE OF x0, AND ABSOLUTE VALUE OF TARGET VELOCITY < ABSOLUTE VALUE OF PREDICTED VELOCITY ?
YES
S10
SWITCH MODE TO DECELERATED VELOCITY MODE
S11
SET VELOCITY FEEDBACK INPUT = 0
NO
S9
EXECUTE CALCULATION OF VELOCITY CONTROL DEVICE
S12
OUTPUT VCM CONTROL SIGNAL D
S13
SET INITIAL VALUE 48 ONLY IN FIRST TIME
S14
CALCULATE BOTH SEEK WAVEFORM Pt AND ACCELERATION WAVEFORM Ut
S15
OUTPUT VCM CONTROL SIGNAL D
S16
COMPARE T ≧ T ?
NO
YES
SEEK OPERATION END

FIG.15


INITIAL VALUE
48
ACCELERATION WAVEFORM
49
FEEDFORWARD INPUT
32
VELOCITY WAVEFORM
250
TARGET VELOCITY
234
44
DELAY MODEL
VELOCITY ERROR
229
46
VELOCITY CONTROL DEVICE
VELOCITY FEEDBACK INPUT
31
+
−
+
+
47
VELOCITY PREDICTING DEVICE
HEAD SEEK SIGNAL P
200
CONTROL OBJECT
VCM CONTROL SIGNAL D